

# Breeding Range and Population Status of Lesser Prairie-chickens in Colorado

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**ABSTRACT** — The current breeding distribution and population status of the lesser prairie-chicken (*Tympanuchus pallidicinctus*) in Colorado were investigated from 1986 to 1990 and compared to historical records. Little is known about their original distribution, although reports suggest they may have been resident in six southeastern counties. Both population size and distribution declined because of habitat loss and deterioration after settlement in the late 1800s and reached their nadir after the "dust bowl" days of the early 1930s. Self-sustaining populations presently occur in Baca, Prowers, and Kiowa counties. Total breeding population size is estimated at 1000-2000 individuals with more than 50 active display grounds and 350 males being counted in recent years, an increase from 13 display grounds and 104 males counted in 1962. This species is presently listed as threatened in Colorado. Additional population increases and range expansion could be achieved with appropriate range management practices and a transplant program.

**Key words:** Colorado, distribution, lesser prairie-chicken, population, *Tympanuchus pallidicinctus*

## HISTORICAL REVIEW

Lesser prairie-chickens (*Tympanuchus pallidicinctus*) historically occupied suitable sand sagebrush (*Artemisia filifolia*) and shinnery oak (*Quercus havardii*) rangelands of the southern Great Plains, from southwestern Kansas and southeastern Colorado south through western Oklahoma and eastern New Mexico to west central Texas (Aldrich and Duvall 1957, Aldrich 1963, Taylor and Guthery 1980). Within this range they were abundant and widely distributed prior to settlement (Crawford 1980). Some reports suggested lesser prairie-chickens were migratory, and Litton (1978) estimated the wintering population in Texas at 2 million prior to 1900. The distribution of lesser prairie-chickens in North America has decreased by 92% since the 1800s because of habitat loss and deterioration (Taylor and Guthery 1980), and the population has declined by 97%, reaching a low point after the widespread drought of the 1930s (Crawford 1980).

The historical distribution and status of lesser prairie-chickens in Colorado are not well documented because early Colorado explorers and naturalists apparently bypassed much of the southeastern part of the state (Rockwell 1908). The earliest reference to prairie grouse in Colorado was that of George Frederick Ruxton, who reported the "boom of the prairie fowl" as he traveled up Fountain Creek in present El Paso County in 1847 (Kephart 1926). However, this report most likely refers to the plains sharp-tailed grouse (*T. phasianellus jamesi*) (Hoag and

Braun 1990). Hoffman (1963) concluded that although suitable habitats for lesser prairie-chickens may now exist in El Paso County, it was doubtful these habitats were occupied historically. Thus, it is likely that lesser prairie-chickens may have been resident only in Baca, Bent, Cheyenne, Kiowa, Lincoln, and Prowers counties prior to settlement.

The first documented record of lesser prairie-chickens in Colorado is a specimen in the Denver Museum of Natural History (#4146) collected by F. C. Lincoln in Baca County on 24 May 1914 (Lincoln 1918, Bailey and Niedrach 1965). Additional early specimens are known from Baca County (DMNH #4218, 4219) (September 1914), and Prowers County south of Holly (DMNH #6080-6082) (September 1916). Nine additional specimens and clutches in the DMNH are all from Baca and Prowers counties (Bailey and Niedrach 1965). There are 14 Colorado specimens in the American Museum of Natural History (#751222, 751225-751233, 353641-353644, R. A. Sloss, pers. commun.) and 2 (#588739, 588740) in the National Museum of Natural History (M. R. Browning, pers. commun.), all from Baca County. A remnant population was reported to have persisted in Bent County until the early 1940s (Hoffman 1963), although specific documentation is lacking. Lesser prairie-chickens were classified as a threatened species by the Colorado Division of Wildlife in 1973 because of their low population size and limited distribution within the state.

Historical and current distribution of lesser prairie-chickens in areas adjacent to Colorado include Norton, Stanton, and Hamilton counties in southwestern Kansas (Baker 1953, Horak 1985, Thompson and Ely 1989), Cimarron County in Oklahoma (Copelin 1958, 1963; Sutton 1967; Cannon and Knopf 1980), and Union County in New Mexico (Bailey 1928, Ligon 1961). These populations have become fragmented, and those in northern New Mexico are isolated from other populations (Sands 1968, Crawford 1980).

This paper documents the historical and current distribution and population status of lesser prairie-chickens in Colorado. Lek survey data, including lek (display ground) numbers, lek densities, and male densities, are also presented.

## METHODS

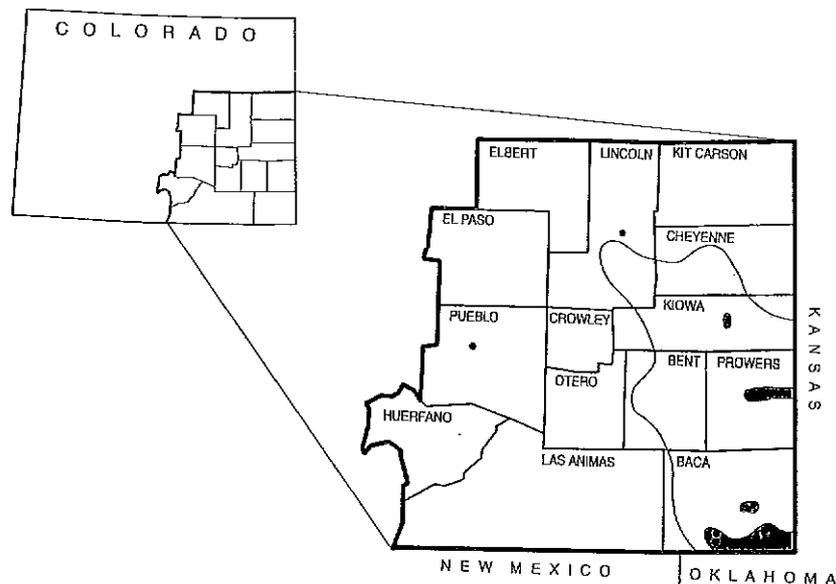
Population status and distribution of lesser prairie-chickens in southeastern Colorado were ascertained from routine lek surveys and extensive searches conducted by the Colorado Division of Wildlife. Known display grounds were surveyed between mid-March and mid-June to ascertain activity status and to obtain counts of male and female grouse. Searches for additional display grounds were made by driving along accessible roads in suitable-appearing habitats from dawn to mid-morning, especially in areas adjacent to known occupied habitats, and scanning with binoculars and listening for courtship calls. Because not all grouse observed on display grounds were classified to sex and there was no method for ascertaining accuracy of various observers in classifying sex of lesser prairie-

chickens, the number of males was estimated as the total number of grouse observed minus the number of hens identified. Because relatively few females were identified, and most display grounds were surveyed after the peak of mating, most (>95%) grouse observed annually were likely males. Estimates of total breeding population size are based on a 1:1 sex ratio and 50-100% of males attending display grounds (Robel 1970).

## RESULTS

### Distribution

The current breeding range of lesser prairie-chickens in Colorado has decreased and become fragmented since settlement (Fig. 1). The largest population now occurs in southeastern Baca County, primarily east of Campo on the Comanche National Grasslands, and adjacent to the Cimarron River. Smaller populations exist in Baca County southeast of Springfield, in Prowers County south of the Arkansas River between Holly and Granada, and in Kiowa County north of Chivington along Big Sandy Creek. The population in Kiowa County is restricted to one location and apparently isolated from other populations in Colorado and Kansas. However,



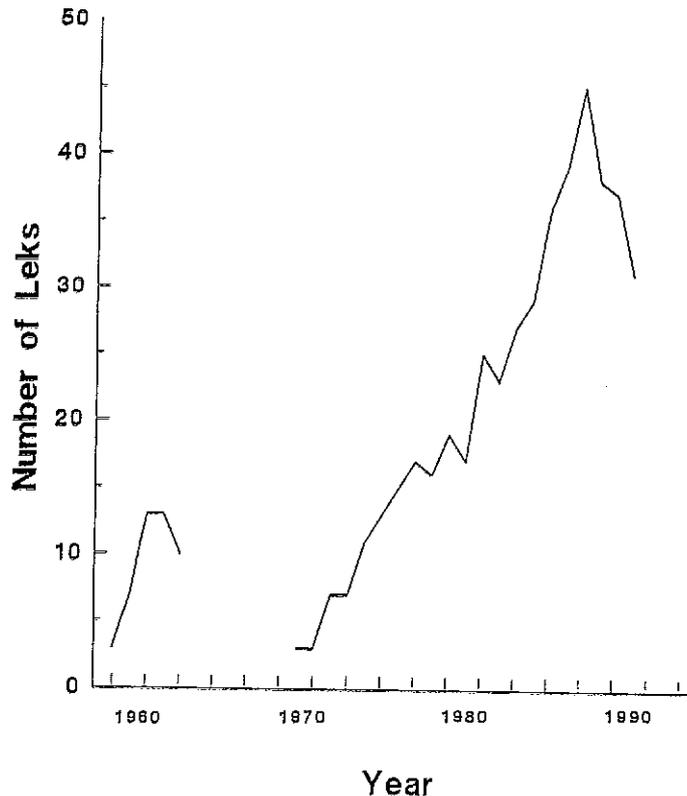
**Figure 1.** Presumed maximum historic (light shading) and current distribution (dark shading) of lesser prairie-chickens in Colorado. Locations of transplants since 1960 are indicated by closed circles.

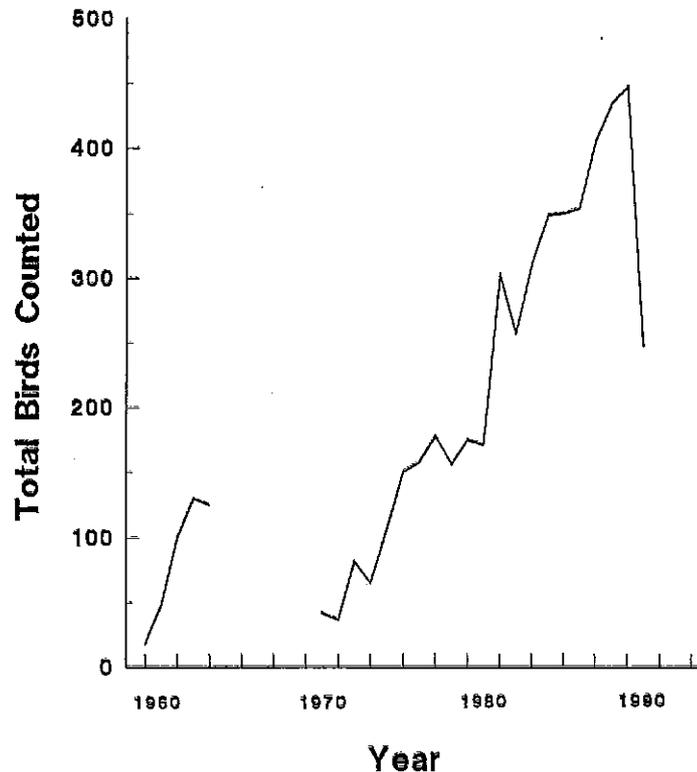
populations in Baca and Prowers counties, especially those in Baca County adjacent to the Cimarron River, are contiguous with populations in Oklahoma and Kansas.

There have been several transplant attempts since the 1960s to extend the range of lesser prairie-chickens into suitable appearing habitats outside of their presumed historic range in southeastern Colorado (Lincoln and Pueblo counties) and to augment existing populations (Baca County). At least eight different transplants occurred with 8-75 birds released per site. Most transplanted birds were captured from wild flocks in Kansas. It is too early to evaluate the success of the 1993-94 transplant of 75 birds into Pueblo County. None of the other transplants was successful in expanding the range of lesser prairie-chickens or in establishing new populations.

#### Population Status

The number of active display grounds (Fig. 2) and total number of lesser prairie-chickens observed on leks (Fig. 3) have increased substantially since





**Figure 3.** Total number of lesser prairie-chickens counted on display grounds in southeastern Colorado, 1959-1990. No data are available for 1964-1969.

surveys were begun in 1959. During 1986-1990, 40, 14, and 4 active display grounds were located in Baca, Prowers, and Kiowa counties, respectively. The number of males identified annually during this period ranged from 230 in 1990 (an incomplete survey) to 399 in 1988. Assuming all display grounds were surveyed and a 1:1 sex ratio, the minimum breeding population was nearly 800 birds. Because surveys of suitable habitat were incomplete each year, and counts of males on display grounds may not represent the total male population, the actual breeding population in the late 1980s most likely was 1000-2000 birds.

The number of males/display ground counted during 1986-1990 ( $n=1,218$  accurate counts) ranged from 1 to 42, with a mean/lek of 9.6 ( $SD=6.1$ , median=8). Most (69.6%) display grounds had 5-15 males; only 6% of all display grounds had more than 20 males. Lek density on one 41.40-km<sup>2</sup> area in Baca County ranged from 0.14 to 0.22 leks/km<sup>2</sup>, and male density (based on lek counts) on the same area

ed from 1.3 to 2.4 males/km<sup>2</sup>. All other areas surveyed in Colorado had lower densities of display grounds and males.

## DISCUSSION

Although populations of lesser prairie-chickens have increased substantially since 1959, their distribution appeared to change little. The population in Kiowa County apparently has persisted since the late 1800s despite being isolated from other populations in Prowers County and in Kansas by more than 60 km. Remnant populations in Baca and Prowers counties persisted despite habitat fragmentation and deterioration following settlement, conversion of native rangelands to agricultural cropland, and a major drought in the 1930s (Bailey and Niedrach 1965). Emigration from Kansas and Oklahoma may have contributed to maintaining these populations.

Increased survey efforts since 1980 resulted in additional display grounds being located, especially on privately owned rangelands. However, the increase in population size since 1959 is attributed primarily to periods of favorable precipitation, better habitat conditions, and management practices allowing recovery of sand sagebrush rangeland on some pastures within the Comanche National Grasslands in Baca County (Hoffman 1963). Densities of lesser prairie-chickens in sand sagebrush habitats in Oklahoma (Copelin 1963) are greater than those reported for Colorado (this study), suggesting that additional management practices to improve habitat quality could result in larger populations. Cannon and Knopf (1981) reported that densities of displaying males were positively correlated with percent cover of sand sagebrush, and Rodgers and Sexton (1990) reported that chemical control of sand sagebrush in Kansas had negative effects on lesser prairie-chickens. Thus, management efforts to enhance sand sagebrush may be one strategy to increase populations of lesser prairie-chickens in Colorado.

Shortgrass rangelands dominated by buffalograss (*Buchloe dactyloides*) and grama (*Bouteloua gracilis*) or croplands currently limit lesser prairie-chicken expansion from core populations in Colorado. Recent conversion of cropland to grassland under the Cropland Reserve Program may be beneficial to lesser prairie-chickens in southeastern Colorado if maintained longer than 10 years and managed to enhance establishment of sand sagebrush and native forbs. Additional expansion of lesser prairie-chickens in southeastern Colorado may depend on the ability of these grouse to expand into suitable but unoccupied habitats, primarily within their historical range.

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